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IMPLICATIONS OF SS-7 YAW GUIDANCE
FROM SOFT SITE CHARACTERISTICS

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The complex of lines formed by cleared swaths forward of the launch areas at certain SS-7 soft sites are believed to provide presurveyed azimuths to permit aligning an inertial platform in the SS-7 guidance system to an accuracy of 10 arc-seconds or less. Telemetry analysis previously has produced strong evidence that the SS-7 guidance system is inertial in the pitch plane, and thus, it is concluded that the SS-7 has an all-inertial (autonomous) guidance system.

Recent photographic coverage of the SS-7 soft launch sites at Yurya (See Figure.) has shown 10-foot swaths in the surrounding wooded areas extending 1000 to 2000 feet in front of the launch complexes. When extended over the cleared areas immediately around the launch pads, the complex of lines defined by these swaths indicate two lines, less than 90 degrees apart, converging at a point between 100 and 200 feet to the left of the left pad as well as two others converging at the same distance to the left of the right pad. A survey of other SS-7 soft sites has indicated similar markings through vegetation in front of the pad.

These clearings are believed to yield optical access to surveying monuments (concrete piers) at the extreme ends of the clearings. The access is required by theodolites mounted on piers, to the left of the vehicles in order that the known azimuths (carefully presurveyed) of the lines can be carried into a mirror mounted on the guidance platform in the vehicle. It is by such means that azimuths are established for inertial platforms. The fact that the lines converge at between 100 to 200 feet to the side of the pad is compatible with the placement of exterior optical equipment at such a distance from the vehicle that the elevation angle from the ground to the mirror in the missile guidance compartment (which in the SS-7 is either directly below the re-entry vehicle or between the upper stage tanks) is kept less than 30 degrees. The fact that for both pads the lines converge to the left of the vehicle probably indicates that the vehicles are loaded on the launcher with the same orientation irrespective of which launcher is used so that the window giving optical access to the guidance compartment would always be on the same side of the pad. The length of the lines extending forward

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of the pad, the belief that there are at least two monuments for each alignment site, and the less than 90 degree angles

between the lines of sight support the use of this technique. (TOP SECRET CHESS RUFF [REDACTED])

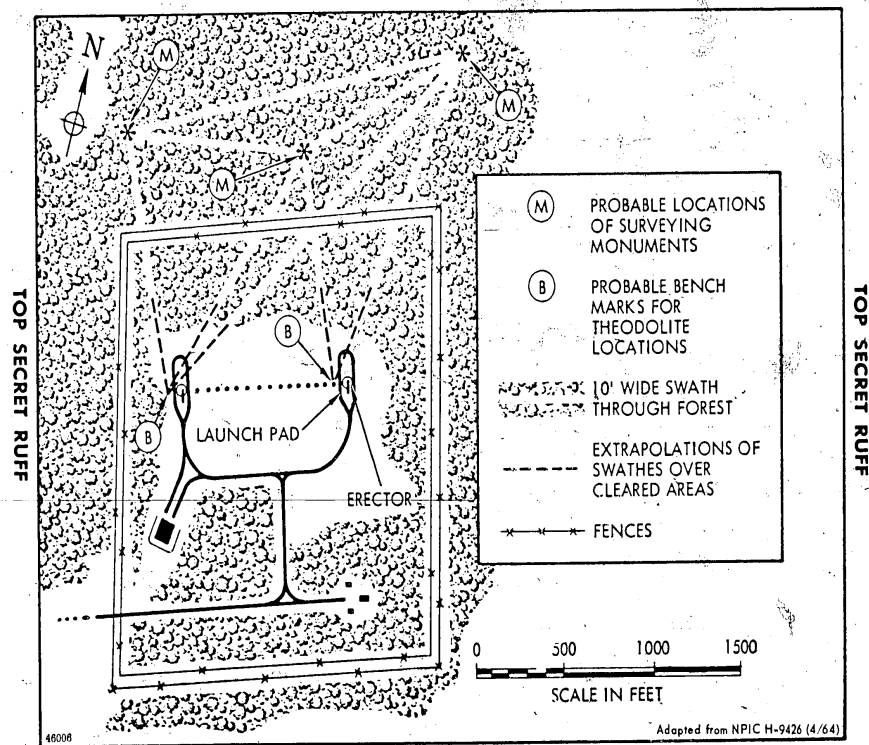
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SS-7 Launch Area I, Yurya, USSR, Showing Optical Access Swathes Through Wooded Area

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ASSESSMENT OF NEW HEN HOUSE FACILITIES IN THE USSR*

Defensive Systems Division
OSI/CIA

SUMMARY AND CONCLUSIONS

Sixteen new HEN HOUSE antennas are under construction in the USSR; two at Olenegorsk, eight at Angarsk, and six at Sary Shagan. These facilities could be completed by the end of 1965 or early 1966.

The Olenegorsk facility is probably a part of a ballistic missile early warning facility and could also be used as part of a satellite tracking net. If a ballistic missile early warning net is contemplated by the USSR, several additional installations will be required on the northern periphery.

The Sary Shagan and Angarsk facilities are probably for satellite tracking and may comprise the total satellite tracking net. However, the Olenegorsk facility could supplement the other two facilities in a satellite tracking role, and/or additional facilities could be built elsewhere.

* Reprint of Summary and Conclusions of OSI-SR/TCS/64-1, 28 August 1964, TOP SECRET RUFF [REDACTED]

The new installations at Angarsk and Sary Shagan, when completed, will represent a capability considerably in excess of that required merely to detect the passage of U.S. space vehicles. The USSR already has a capability to track its own satellites, utilizing transmissions from them, with greater accuracy than would be provided by the new system. These factors, when coupled with the estimated technical characteristics of the new system, suggest that the Soviets are proceeding with the construction of an anti-satellite system. Present evidence, however, does not permit a firm judgment regarding Soviet intent to employ such a system, and it should be pointed out that a nuclear warhead would probably be required on the interceptor missile.

No anti-satellite launch facilities have been identified to date, but interceptor missiles could be launched from one of the test ranges or from an operational ballistic missile site with little or no advance indication. (TOP SECRET RUFF [REDACTED])

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NEW SPACE FACILITIES
AT THE TYURATAM MISSILE TEST CENTER*[REDACTED]
Ballistic Missiles and Space Division
OSI/CIA

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CONCLUSIONS

The scope of construction now underway at Tyuratam indicates that the Soviet Union is committed to an expanding and increasingly diversified rocketry program. Details of the new construction indicate that new or augmented space-associated launchings utilizing new boosters are planned. Such launchings may occur before mid-1965.

The characteristics of the construction at Complex G strongly suggest that the facility is primarily space oriented. Although different sizing constraints seem to have dictated the design of each of the pairs of pads at this Complex, similarities among the pads and the use of common support facilities indicate that this new research and development complex will possibly be used to support and launch a family of several different configurations of clustered boosters. These boosters may be variations of some presently known engine-plus-tankage module, such as the SS-8. Pads G3/G4 are expected to be completed by the spring of 1965 and appear to be de-

signed to support space operations utilizing a booster having a thrust of as much as 1.5 million pounds.

The construction between Complexes A and E, now designated Complex J, is probably intended to be another independent launch complex. The size of the support area and of the probable assembly building foundation suggests a launch complex capable of supporting multimillion-pound-thrust boosters for space exploration. A more definitive analysis of the size of the booster intended to be used must wait until launch structures are discernible and the apparent assembly building is further developed. These facilities are not expected to be ready to support a flight test program before mid-1966.

Launch Complex B has been expanded for increased support of SS-6 boosted spacecraft. The absence of noticeable changes to the SS-6 launcher at Complex A indicates a further use of the SS-6 at that Complex. These indications leave little doubt that the SS-6 will continue to be used for some space missions. (TOP SECRET RUFF [REDACTED])

* Reprint of Conclusions of OSI-SR/
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